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Effects of foreign direct investment on the performance of local labour markets – The case of Hungary

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EFFECTS OF FOREIGN DIRECT INVESTMENT ON THE PERFORMANCE OF LOCAL LABOUR MARKETS – THE CASE OF HUNGARY

by

KÁROLY FAZEKAS

Abstract

Post transitional labour markets of the CEE countries have been characterised by marked regional differences. Since labour market differences were mainly generated by demand side factors the paper will concentrate on the spatial pattern of job creation determined mostly by the allocation decisions of foreign investors. Thus, the success or failure of local economies or local labour markets were largely determined by the attractiveness of the individual regions towards FDI. Post-transitional winners of local labour markets can boast of high doses of FDI inflows, while high unemployment regions have been suffering a persistent lack of outside investments. Our analysis intends to identify the winners and losers of transitional local labour markets and to calculate the possible effects of EU-accession on local labour markets in Hungary. Based on micro regional data sets the paper describes the regional distribution of foreign and domestic employment. The first section of the paper discusses the time path of regional labour market differences in Hungary between 1990 – 2001 and identifies the winners and losers of transition. The second chapter analyses the spatial distribution of FDI and domestic firm's employment and identifies the most important explanatory factors of their regional distribution.

Key words: local labour markets, FDI, transition economies, Hungary
JEL classification: F02, F23, J40, R12

FAZEKAS KÁROLY

A KÜLFÖLDI MŰKÖDŐTŐKE-BERUHÁZÁSOK HATÁSA A MUNKAERŐ-PIAC REGIONÁLIS KÜLÖNBSÉGEIRE

Összefoglaló

Jelentős regionális különbségek alakultak ki a kelet-közép európai országokban a rendszerváltást követő időszakban. Mivel ezeket a különbségeket leginkább a munkaerőpiac keresleti oldalán zajló folyamatok indukálták, a tanulmány elsősorban a munkahelyteremtés regionális jellemzőire koncentrál. Magyarországon a munkahelyteremtés területi különbségeit elsősorban a külföldi működőtőke-befektetések területi eloszlása határozta meg az elmúlt években. A helyi gazdaságok, helyi munkaerőpiacok jellemzőit döntő módon befolyásolta az egyes régiók tőkevonzó képessége. Az átmenetet követő időszak nyertesei általában azok a helyi munkaerőpiacok, melyekben az átlagnál magasabb a külföldi tulajdonú foglalkoztatás relatív koncentrációja, míg a magas munkanélküliséggel, alacsony foglalkoztatással jellemezhető területeket elkerülték a külföldi beruházók. A tanulmány a hazai és külföldi tulajdonú vállalatok jellemzőire vonatkozó kistérségi szintű adatbázisra alapozva bemutatja a hazai és külföldi tulajdonú vállalatoknál foglalkoztatottak területi eloszlásának jellemzőit. Az első fejezetben bemutatjuk a munkaerőpiac regionális különbségeit az 1990-2000 közötti időszakban és összehasonlítjuk a legkedvezőbb, illetve legkedvezőtlenebb helyzetben lévő helyi munkaerőpiacokat. A második fejezet elemzi a hazai és külföldi tulajdonú foglalkoztatás területi eloszlását meghatározó legfontosabb tényezőket.

Introduction

Full employment, social equality, and balanced regional development were the major explicit policy goals during the old regimes in Central and Eastern European (CEE) countries for more than four decades. It was in this field of "socialist achievements" that the most dramatic changes occurred over the years of transition. Where full and life-time employment, high activity, scarcity of labour, compressed income distribution used to be the standard, the situation now is just the reverse in many respects. The transition in these countries has been accompanied by large scale redundancies, massive and frequently long-term unemployment, a high level of inactivity, and growing income disparities. One of the most striking consequences of transition was the emergence of large regional disparities in terms of economic output, productivity, labour market activity and wage and income indicators.

Regional labour market imbalances were already expected at the start of the transition. This is due to the high spatial concentration of industries affected by the collapse of the COMECON markets, and also to the fast decrease of agricultural employment in rural regions. The major concern is that while the transitional crisis is over, there are no signs of any reversal in this negative trend. In the case of Hungary indicators of regional labour market differences have been showing a steadily increasing trend, both polarisation and increasing core-periphery division.

Empirical evidence shows that regional disparities are accelerated by the fast integration of these economies into the global economy and the driving force of this process is the mass inflow of FDI into CEE countries. We expect a fast integration of accession countries to the enlarged EU economy and a further increase of FDI towards CEE regions. How would this process affect regional disparities of these countries? Which regions will be the winners and the losers in the years to come? Would these countries achieve a more balanced regional landscape within the enlarged European Union using the available community resources of regional development policy or should we expect a further increase of regional differences? Would the losers of the transition also become the losers of the accession or is there a real chance to stop the further deterioration of backward regions? These are the central questions of this paper.

In the first part we describe the evidence on regional evolutions: increasing disparities, rank stability, polarisation, and core-periphery division at the level of the local labour markets in Hungary. In the second part, the impact of spatial concentration of foreign and domestic corporate employment in local labour markets is measured and the most important explanatory factors of spatial concentration will are identified. This is followed by conclusions and a few policy relevant messages.

1. Winners and losers of transition at the level of local labour markets

Increasing spatial differences, polarisation and the core-periphery division of the local labour markets in Hungary

The transition from central planning to a market economy was associated with the dramatic increase of regional disparities in CEE countries. The widening gap between depressed and prosperous regions is characterised by considerable labour market disparities in terms of employment, unemployment and wages.

Comparative analyses of regional labour market differences are mostly taken at macro or meso level of regions.[3] (EC 2000, Boeri and Scarpetta 1996, Dorenbos 1999, OECD 1995, Gacs and Huber 2003, Huber and Wörgötter 1999) In the case of Hungary the HCSO[4] publishes macro-region level time series of the Labour Force Surveys and the national accounts. These data show that the decline in economic performance and employment has been much more severe in disadvantaged rural regions of the East and Southwest than in the more urbanised Central and North-western territories. Nevertheless, regional employment or unemployment rate differences at the macro-region level are not particularly large in international comparisons and have not tended to increase during recent years.

[3] Macro, meso and micro level regions refer to NUTS2, NUTS3 and NUTS4 levels in EUROSTAT nomenclature. For a comprehensive description of the NUTS classification see Eurostat (1995).
[4] Hungarian Central Statistical Office

Table 1
Registered unemployed/working age population ratio by four levels of regions (2002. March)

Regional Levels	Number of regional units	Minimum	Maximum	Range	Std. Deviation	Variance
Settlements	3135	0.46	53.33	52.87	4.29	18.41
Micro regions	150	1.40	19.63	18.23	3.15	15.38
Meso regions	20	1.67	10.14	8.47	1.98	6.30
Macro regions	7	2.00	9.53	7.53	2.18	7.40

Source: NLC Unemployment Register

The problem is that in the case of Hungary macro- or meso-region level analyses of labour market indicators give a distorted picture. Due to the relatively high travel costs of commuting and the underdeveloped transport infrastructure local labour markets are closed and fragmented. The size of local labour markets (LLMs) fits more into the category of "micro-regions".[5] Table 1 illustrates this situation. More than 83 per cent of the variance of settlement level unemployment ratios is accounted for between micro-region differentials. Only 34 percent is accounted for between-meso region and 40 percent for between-macro region differentials. In the following parts of the paper we will concentrate on micro-region level disparities of the Hungarian labour market.

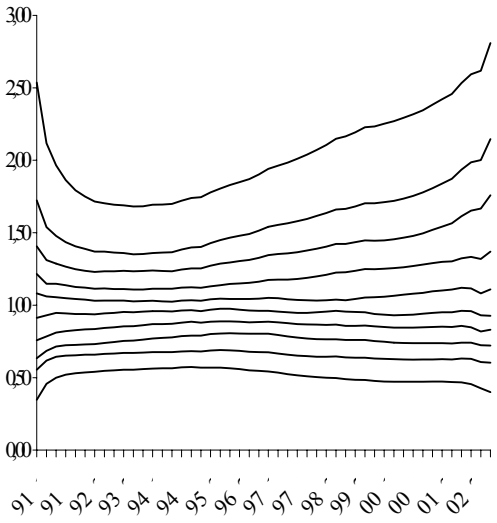
Additionally the wide range of dispersion time series of micro-regional data have indicated a disturbing long-term tendency. Expressing mean registered unemployment rates[6] of each deciles of the 150 micro-regions in the percentage of the median at each period gives us a detailed picture of the time path of relative unemployment rate differential. This measure is, by definition, independent from the actual levels of unemployment. (Figure 1) We can see that high differences appeared during the turbulent period of the collapse of the old economy. In the second phase of transition, after a short period of decrease and stagnation, regional differences began to increase

[5] There are 7 statistical-planning regions (NUTS-2 units), 19 counties and the capital, Budapest (NUTS-3 level units), 150 statistical micro-regions (NUTS-4 level units) and 3100 settlements, local authorities in Hungary. The average size of micro-regions is 620.2 km^2, the average number of the local population is 77279 and the average density of population is 108.5 cap./km^2 (Faluvégi 2000). Given the relatively high cost of public transport the effective local labour market in backward regions is estimated to be confined to a radius of 16 km or less. (OECD 2002)

[6] The small sample size of the HCSO Labour Force Survey does not allow us to calculate micro-region level time series for different labour market status of the local population. Micro–region level

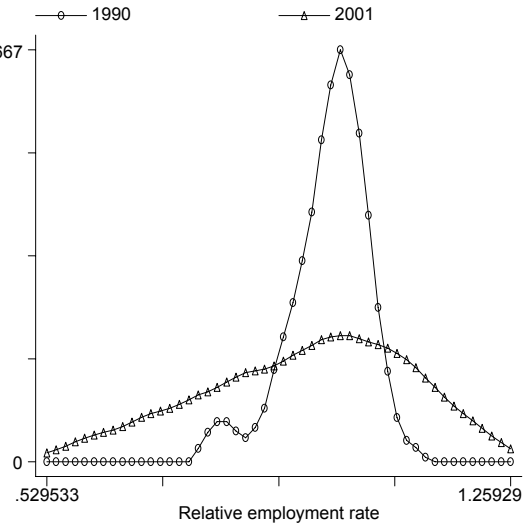
to the latest figures. The widening range has been mainly generated by the continuously deteriorating position of high unemployment regions.

Figure 1
Time path of micro-regional unemployment rate differences (1991/Q1 – 2002/Q3)



Source: National Employment Office
Unemployment Register Data Base

Figure 2
Kernel density of relative employment rates (1990, 2001)



Source: HCSO Census 1990,2001

Continuously growing regional disparities were accompanied by two other important features: *high rank stability* and *polarisation* of micro-regions. The majority of micro-regions which were in a relatively good position at the starting point recovered faster from the transitional shock and turned out to be the winners of the post transitional period, while the vast majority of backward regions of the socialist economy were not able to emerge from their disadvantageous status even after 10 years of transition. Table 2 shows the inter quartile transitional matrix of micro-regions. Quartiles were calculated according to the employment rates of micro-regions in 1991 and 2001. Despite the enormous changes in the economy and society during those ten years, 62.2 percent of regions in the top quartile and 81.1 percent of regions in the bottom quartile remained in the same brackets. The correlation coefficient between the pre- and post-transitional employment rates is 0.85. High rank stability refers to long-term, hard-to-change explanatory factors behind the successes and failures of the micro-regions. (Ábrahám and Kertesi 1998, Fazekas 1996, 2000)

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registered unemployment rates could be calculated from the settlement level Unemployment Register Data Base of the National Employment Office.

Table 2.
Between quartiles transition matrix of micro regions
1990 – 2001 (%)

1990	2001				
	Botom	**Q2**	**Q3**	**Top**	**Total**
Botom	**81.1**	16.2	2.7		100.0
Q2	18.4	**57.9**	23.7		100.0
Q3		21.1	**42.1**	36.8	100.0
Top		5.4	32.4	**62.2**	100.0

Source: HCSO Census 1990, 2001
Note: Quartiles of micro-regions were classified according to employment rates in 1990 and 2001. (Employment rate = employed population / working age population)

Figure 2 shows the Kernel density of relative employment rates of micro-regions in 1990 and 2001. The two lines reflect high *polarisation* of micro-regions. Not only the range of the relative employment rates, but also the density of regions at the low and high end of the distribution have increased during the 1990's. This polarisation has led to an emergence of the sizeable groups of "extremely high" and "extremely low" employment regions.

Grouping micro-regions into quartiles according to employment rates gives a simple but clearly defined picture of winners and losers of transition at the level of LLMs. Social and economic indicators of the four quartiles indicate that employment rates are quite good proxies of the successes and failures of local economies and local societies. Table 3 shows that a high employment rate comes together with higher production, higher enterprise density, higher productivity of local firms and higher incomes, relative wealth and welfare of the local population. Low employment rate is accompanied by weak performance of the local economy, low enterprise density, low productivity of the local firms, and low income, relative poverty and lower life expectancy of the local population. The top quarter (high employment) regions cover 20.3 percent of the territory and 38.8 percent of the population of the country. The corresponding figures of the bottom quarter (low employment) regions are: 24.6 and 14.1 percent.

Table 3
Selected regional indicators at the level of micro-regions (2001)

	Bottom quartiles	Q2	Q3	Top Quartiles	Q4/Q1
Labour market:					
Employment ratio (%)	40.9	50.8	57.5	65.6	**1.6**
Unemployment ratio (%)	10.9	7.9	5.9	4.3	**0.4**
Inactivity ratio (%)	48.2	41.3	36.6	30.0	**0.6**
Long term unemployment rate (%)	6.2	3.8	2.4	1.3	**0.4**
Urbanisation (%)	27.9	48.0	59.9	81.8	**2.9**
Taxable income	185318	240587	286117	407874	**2.2**
Number of cars per 1000 cap.	152	195	226	266	**1.7**
Mortality rate	14.7	14.6	14.1	13.6	**0.9**
Local economy					
GDP/cap 2001[1]	179	363	439	1168	**6.5**
Enterprise density[3]	9	17	20	42	**4.7**
FIEs Productivity (manufacturing)	17490	17700	21304	28321	**1.6**
DEs Productivity(manufacturing)	5059	6388	6346	8697	**1.7**

Notes:
[1] Restricted to the business sector. 1000 HUF. Source: ECOSTAT 2003.
[2] Manufacturing. Productivity = Net sales/employees. Source: IE-FDI Data Base
[3] Enterprise density: Number of firms with legal entity/ 1000 cap. of local population in 2001.
Source: HCSO Tsar data base

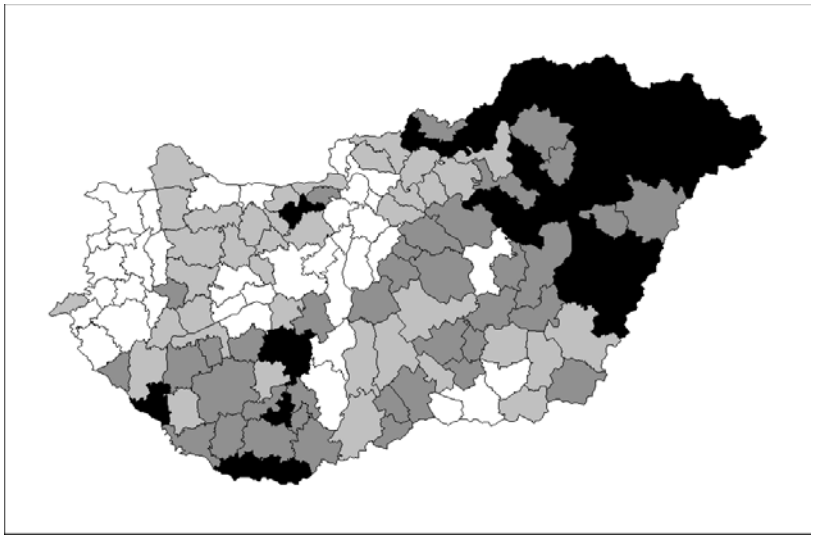
Figure 3. shows the geographical distribution of winners and losers (top and bottom quartiles of micro-regions) in 1990 and 2001. One can see a clear east-west, core-periphery division before and after the transition. The central agglomeration, and regions along the main east-west transport routes in the direction of Graz and Vienna have the highest employment rates while most of the low employment regions are located along the East-Slovakian, Ukrainian and Romanian and Croatian borders.

Comparing the two maps it is striking that the core-periphery division of micro-regions has become stronger over the 90s'. Regional employment rate differences are increasingly determined by the region's proximity to the capital and to western portals. The average distance of the top quarter from the Budapest-Vienna axis decreased from 43 km to 30 km while the average distance of the bottom quartile increased from 207 to 215 km[7]. This process of increasing core-periphery division can be illustrated by the changes in the average distance of the employed and the average distance of the unemployed population's residence from the Budapest-Vienna axis.

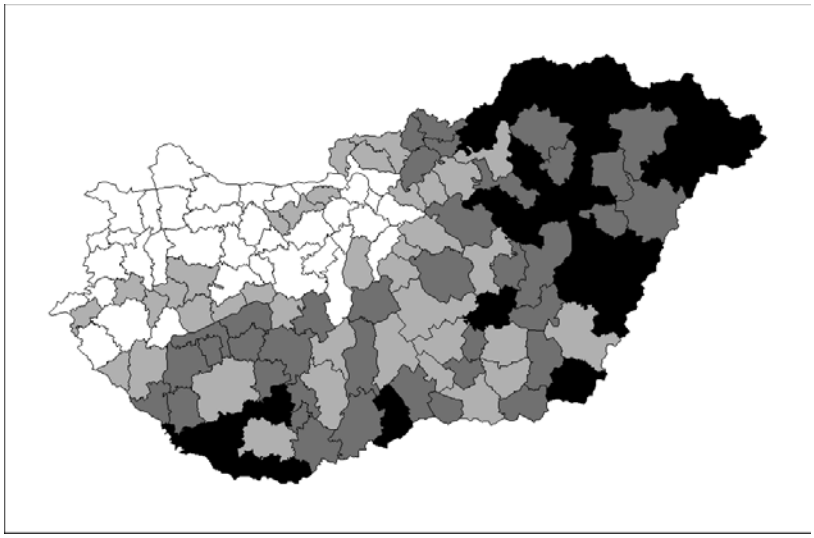
The first one decreased by 6 percent while the second one increased by 12.1 percent between 1990-2001. The correlation coefficients between the average employment rates of micro-regions and the minimum distance of the region's centre from the Budapest-Vienna axis was –0.73 in 1990 and – 0.81 in 2001.

Figure 3.
Spatial distribution of micro-regions in the four quartiles of employment rates

1990



2001



Source: HCSO Census 1990, 2001

[7] Distance of the regions means the minimum distance of the region's administrative centre from the Budapest – Vienna axis on public road weighted by the number of working age population.

The driving force of the increasing spatial differences, polarisation and core-periphery division of micro-regions

Large scale dispersion, polarisation and rank stability of regions in terms of their labour market performance is not a unique feature of Hungary or other transitional economies. A series of empirical studies revealed that the variation in unemployment or employment rates between regions within countries was considerably greater than disparities between countries and there was a tendency of polarisation in Europe in terms of the regional employment/unemployment rates in the 90's. (Taylor and Bradley 1997) Polarisation could be driven by changes in the spatial distribution of the labour force (demographic trends, migration patterns, participation decisions) or changes in the spatial distribution of employment. Theoretical considerations and empirical studies revealed that polarisation of local labour markets is mainly driven by *employment change* as a consequence of *agglomeration forces* in economies.

"European regions experienced a polarisation of their unemployment rates between 1986 – 1996. Regions with high or low initial unemployment saw little change, while regions with intermediate unemployment moved towards more extreme rates. …. It is employment changes that have driven high unemployment regions to their high rates and low unemployment regions to their low rates." (Overman and Puga 1999) Because of data constraints at the level of local labour markets most of the empirical studies on the spatial pattern of job creation deals with the NUTS-2 or NUTS-3 level of regions. One of the rare exceptions is the paper of Peri and Cunat (2001). They investigated geographical determinants of job creation at the level of LLM in the case of Italy between 1981-1996. They found that local agglomeration economies, in particular input-output linkages, social characteristics and the development of the local infrastructure were the most important determinants of the employment growth across Italian local labour markets in the period investigated.

Changes in spatial distribution of employment in Europe seem to be a response to deepening European integration and a consequence of globalisation over the last decade. Empirical evidence on regional evolutions of CEE labour markets shows similar scenarios. Increasing regional differences and polarisation is mainly

determined by the changing spatial distribution of jobs on the labour market.[8] Nevertheless there is no doubt that the dramatic change in spatial distribution of firms and jobs in CEE countries could be evaluated as an inevitable consequence of divergent spatial allocation preferences of firms operating in a socialist planned economy and in a market economy. It is well known that full employment and scarcity of labour were the legacies of the socialist regimes. (Kornai 1980) In the case of Hungary labour demand was quite evenly distributed across skill structure and across local labour markets. Increasing scarcity of labour has encouraged firms to establish affiliates even in the less developed regions where free although less educated labour was available.

When the socialist economy collapsed, about 1.5 million jobs (more than 30 percent of the jobs) disappeared in Hungary during three years. Nevertheless the high intensity of job destruction was accompanied by dynamic job creation in the years of transition. (Kőrösi 2003) Results show invariably that while the intensity of job destruction portray an equal regional distribution, the intensity of job creation follows an uneven spatial pattern. (Nemes-Nagy 2000, 2001) As a direct consequence of the transition to a market economy location preferences of investors have dramatically changed. The vast majority of new jobs captured and created by the emerging private sector was highly concentrated in developed urban agglomerations of the country.

Emerging unemployment rate differences could be attributed mainly to the differences in the entrepreneurial and industrial capacity of regions at the starting point of transition. (Fazekas 1996, Ábrahám and Kertesi 1999) The effect of the state run large industries on their own was negatively related to the level of unemployment. The dominance of the state-owned industry led to higher unemployment only in those regions where this dominance was coupled with low entrepreneurial capacity. Entrepreneurial capacity refers to the extent to which the infrastructure and the social,

[8] As in other CEE countries internal migration flows have remained at a very low level in Hungary (Burda and Profit 1996, Fidrmuc 2001, Rutkowski 2001, Kertesi and Köllő 2001) Using aggregate in and out migration data by settlements, Kertesi (2000b) has proved that migration behaviour reacts to economic incentives. Regions with high unemployment rates have suffered substantial migration losses while those with a low level of unemployment had migration gains. The magnitude of this effect, however, is quite modest and likely to remain so in the near future. According to Kertesi's calculation even migration of a considerably higher level than the current figures would not lead to a sufficient narrowing of the regional unemployment rate differentials in the near future.

human and local economic development conditions were ready at the start of the transition.

Recent analyses on post-transitional characteristics of unemployment differences have shown that the explanatory power of the industrial capacity of regions has diminished while that of the distance of regions from Budapest and the western border has increased. Post-transitional unemployment is typically high in remote agricultural regions with poor infrastructure, low educational levels, poorly developed services and trade, and with large Gypsy communities.[9] Available data on firm creation, small business start ups, physical capital formation, and foreign direct investments suggest increasing rather than decreasing regional differentials in the density of firms, employment and capital endowments.

Impact of FDI inflows on local labour markets

Spatial differentiation was accelerated by the massive inflows of FDI to the CEE countries. This started at the very beginning of transition. A sudden collapse of the socialist system offered a great opportunity for the CEE countries to attract a huge amount of FDI in a short period of time. These countries had a number of industrial regions where relatively cheap and highly qualified labour was available and foreign investments are assumed to play a crucial role in economic restructuring. (Barrell and Holland, 2000, 2001).

Several studies confirmed that FDI was the leading factor in the economic success of Hungary in recent years. (Nemes-Nagy 2000, 2001, Kaminski and Ribound 2000)) Foreign capital can decisively promote the economic restructuring of local economies through the provision of capital, modern technologies and work organisation practices. Foreign capital is also a means for integration into the global economy and can provide important spillovers of know-how towards domestic firms in the region. (Schoors and van der Tol 2001, Sgard 2001, Günther 2002, Konings 2000)

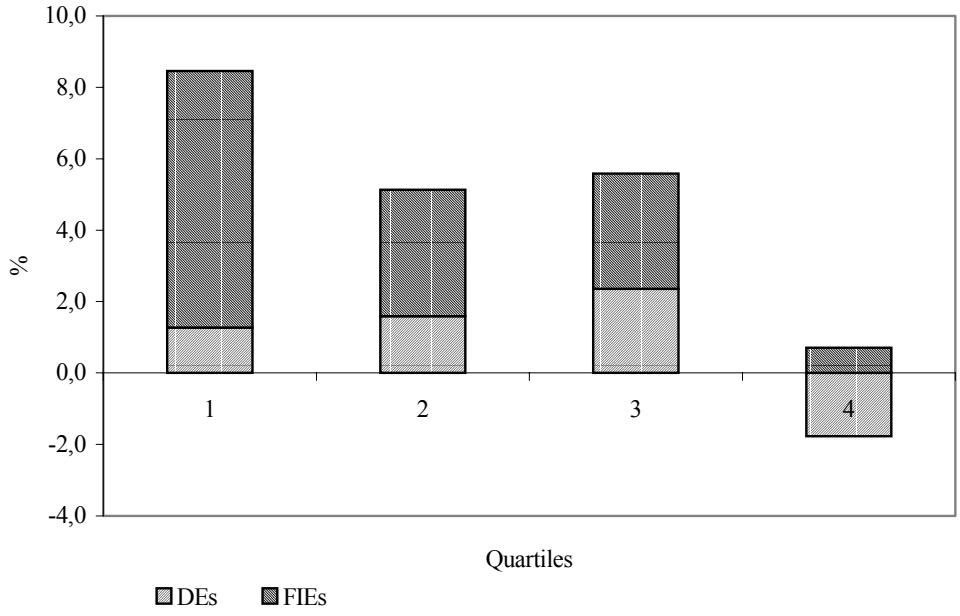
[9] Ábrahám and Kertesi (1998) and Kertesi (2000) give detailed analyses of the changing employment patterns of the Hungarian Gypsy community during transition. Rutkowski's and Przibyla's (2001) analysis on the determinants of regional hiring rate differences show similar results. They are the structure of industrial employment, the educational attainment of the labour force, the labour costs and

HCSO first collected and published detailed information on FDI was in 1992. Foreign owned firms produced 24 per cent of the net sales, 20 percent of the value added in this year. The share of foreign investment enterprises (FIEs) continuously increased between 1992 – 2001. FIEs produced 50 percent of net sales, 49 per cent of the value added and 88 percent of the net exports in the corporate sector in 2000. (HCSO 2001) The fast expansion of foreign firms had a great impact on the labour market. According to the Balance-sheet Corporate Data Base of the HCSO the corporate sector was the only one expanding sector during the years of recovery: 80,4 percent of the net job creation took place within the group of foreign enterprises.

There is no doubt that the spatial distribution of FDI and foreign firms' employment had a great impact on local economies and local labour markets over recent years. According to a series of empirical evidence it was a driving force of polarisation and increasing core/periphery division in Hungary.

Figure 4

Changes of FIEs' and DEs' employees as a percentage of working age population by quartiles of micro-regions (1993 – 2000)



Source: IE-FDI data base
Note: Quartiles were classified by the unemployment rates of micro region in 1993

wage flexibility that are the crucial factors promoting job creation. Education and employment structure have the strongest explanatory power in their model.

Figure 4 illustrates this tendency in the case of the corporate sector, which was the only expanding segment of the labour market during the 90's. The net increase of corporate jobs in the low unemployment regions was more that 8 percent of the working age population between 1993-2000, while the jobs/working age population ratio decreased by 2 percent in the high unemployment regions. The vast majority (80,4 percent) of the net increase was within the foreign enterprise sector and 66 percent of the increase within the foreign enterprises was concentrated in the low unemployment regions.

2. Spatial distribution of foreign and domestic firm's employment in Hungary

Spatial distribution of the foreign firms in the host countries has been at the centre of economic research during the last decade. According to conventional knowledge, based on the theoretical considerations and empirical results of the new economic geography, economic activity tends to agglomerate in certain regions and the allocation preferences of the foreign firms differ from those of the domestic enterprises. (Krugman, 1991 a,b,c,; Krugman and Venables 1990) The attraction of external flows depends upon competitive advantages of regions and it is created and sustained by highly localised processes "which are in turn reinforced by the location capacity to attract resources from outside. This implies that weak regions are those not able to participate in the competitive bidding and be eligible as attractive locations for flows of value added spurred by globalisation and economic integration, the result being an increasing marginalisation of backward areas. The geographical polarisation of (local and foreign) productive activities, once it has occurred, tends to be stable and self-sustaining, thus making inversion somehow improbable and strengthening the coexistence of regional peripheries and centres within national borders." (Iammarino, – Santangelo 2000)

Most evaluations on the impact of globalisation and the EU enlargement on the CEE countries forecast an increasing share of foreign owned firms. If the geographical polarisation of foreign firms is substantially higher than that of the domestic firms, the success of CEE countries to be integrated into the global economy and to attract

further inflows of FDI itself would increase regional polarisation and core/periphery division. It is a crucial aspect of the possible impact of EU enlargement. Policy makers should find appropriate responses to mitigate polarisation effects of increasing integration.

In the following part of the paper we will investigate the spatial distribution of foreign and domestic firms' employment in the corporate sector and will analyse the impact of the increasing share of foreign firms employment on the regional differences and polarisation of local labour markets in Hungary. Job creation and job destruction were mostly restricted to the corporate sector during and following the years of transition. Public employment remained steady throughout the period. The number of self-employed and family firms increased although with large fluctuations. No doubt it would be useful to analyse the spatial distribution of the "micro-firm" sector, but unfortunately, we have no reliable spatial information on this field. However, the corporate sector is the biggest section of the labour market: the public sector roughly accounts for 20 per cent of the registered employment, micro firms, and self-employed for 20-25 percent while the corporate sector covers 60-65 percent. (Körösi, 2003)

Data

The micro-regional distribution of the corporate sector will be analysed on the IE-FDI micro-regional database of the Institute of Economics. The source of these data is the firm level Balance-sheet Corporate Database of the HCSO. This covers all incorporated firms and practically all firms employing more than five persons. In the IE-FDI database a set of balance sheet data of all foreign and domestic enterprises[10] was *separately* aggregated at the level of micro-regions. Data cover all years between 1993 - 2000. We will use micro region level labour market data and a set of micro-region level background variables. Micro-region level labour market data is aggregated from three settlement level data bases: (a) the Unemployment Register

[10] Classification of foreign and domestic enterprises follows international standards: firms with more than 10 percent foreign share are accounted as foreign owned enterprises (FIE's) The average share of foreign capital in FIEs was 82,7 % in 2000.

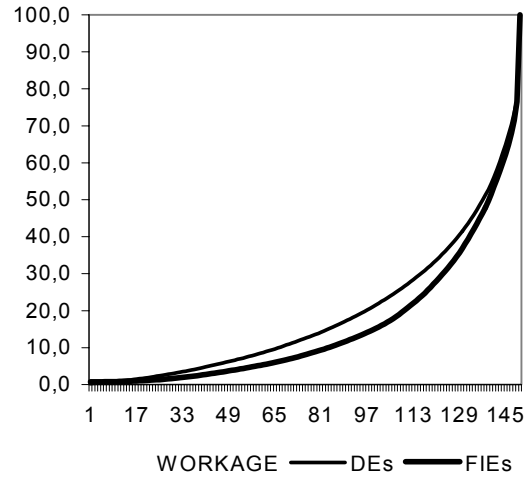
Data Base of the National Employment Office, (b) the T-star data base of the HCSO, (c) the Census data base of the HCSO.

In the existing HCSO-FDI regional data base firms are classified into regions according to the settlement of the headquarters of the firms. This method, however overestimates the spatial concentration of firms because their premises located in other regions are classified to the headquarters' region. (Hamar 1999) Since the balance sheets contain the settlement code and number of employees of each establishment of enterprises, this bias can be reduced by the re-distribution of firms' data between micro-regions in proportion to the establishment's share in the total number of employees of the firms.

Spatial concentration of foreign and domestic firms' employment

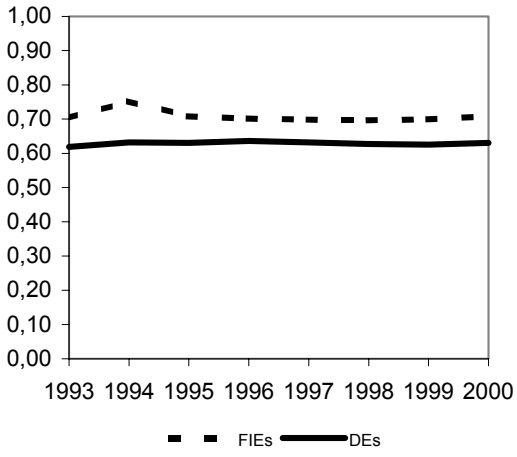
Lorenz curves in Figure 5 show that jobs of the corporate sector have substantially higher spatial concentration than that of the working age population. The Gini coefficients of the working age population, DE's and FIE's jobs were 0,50; 0,63 and 0,71 in 2000.

Figure 5.
Spatial concentration of working age, employed population, FIEs and DEs emloyment in Hungary in 2000
(Lorenz curves)



Source: IE-FDC Data Base

Figure 6.
Time path of spatial concentration of FIEs and DEs employment
(1993 – 2000)
(Gini coefficients)

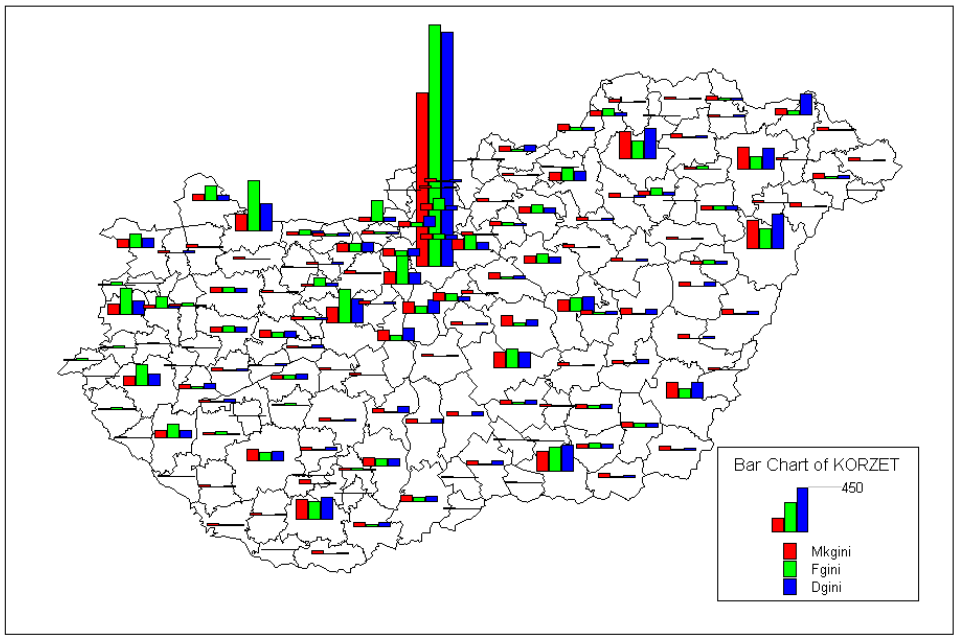


Source: IE-FDC Data Base

FIE's jobs are more concentrated than jobs held by domestic firms within the corporate sector but the difference between the two groups is not particularly high. 17.1 per cent of the working age population. 23 per cent of the domestic firms employment and 23.5 percent of the foreign firms' employment was concentrated in one micro region: to the capital of the country. The top deciles of the micro regions (15 regions) with the highest shares covered 47.7 per cent of the working age population. 55.3 per cent of the DE's jobs and 59.3 percent of FIE's jobs. The time path of Gini coefficients shows that the difference between the spatial concentration of FIE's and DE's jobs did not change and the degree of concentration did not decrease over recent years. (Figure 6.)

Figure 7 shows the absolute concentration of working age population, FIEs and DE's jobs at micro-region level. Columns represent the share of the given micro-region in the country totals of the three variables. One can see that all of the three groups are highly concentrated in the capital and in some urban centre of the country. In addition to Budapest foreign firms are concentrated in some north-west regions and some west-border regions.

Figure 7
Absolute spatial concentration of the working age population, FIE's and DE's jobs at the level of micro-regions



Note: Red : working age population; Green: FIE's jobs; Blue: DE's jobs
Source: IE-FDI Data Base

It is obvious that the corporate jobs are concentrated in regions where a relatively large pool of working age population is available. Using relative concentration indexes we could measure the difference between the spatial distribution of FIE's or DE's jobs and the distribution of a benchmark variable such as the working age population, by the following way:

$$FRCI_{ij} = (FDIL_{ij} / \Sigma_i FDIL_{ij}) / (\Sigma_j WAPOP_{ij} / \Sigma_{ij} WAPOP_{ij}) \qquad 0 < FRCI < \infty$$

$$DRCI_{ij} = (DL_{ij} / \Sigma_i DL_{ij}) / (\Sigma_j WAPOP_{ij} / \Sigma_{ij} WAPOP_{ij}) \qquad 0 < DRCI < \infty$$

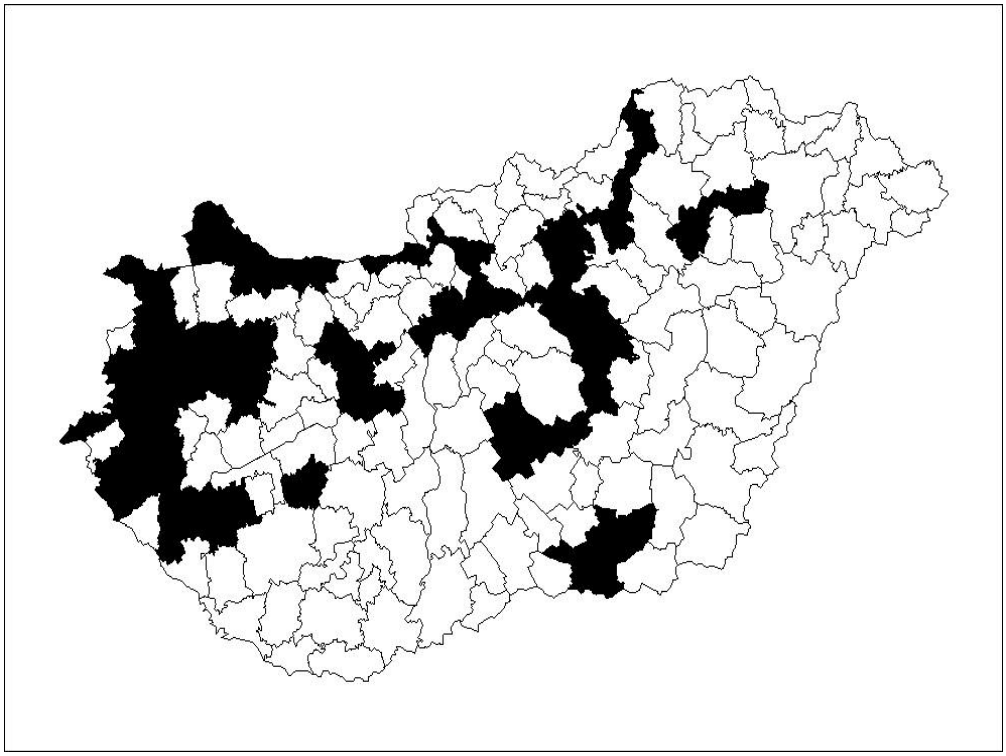
Where:
FDIL: Number of FIEs employees
DL: Number of DE's employees
WAPOP: working age population
(i)= region, (j) = sector

The indexes compare the share of FIE's and DE's jobs located in micro region *i* with the share of working age population located in region *i* in the year *t*. If $FRCI_{ij}$ or $DRCI_{ij} = 1$ in a micro region it means that the share of FIE's or DE's jobs located in the region matches that of the share of the working age population. When the region's FDIL or DL share is greater than the region's WAPOP share, the concentration of foreign jobs in the region is greater than the concentration of the working age population in the regions. Controversially when $FRCI_{ij} < 1$ or $DRCI_{ij} < 1$ it means that the region's FDIL share or DL share is less than its share of working age population. The trend of FRCI or DRCI over time gives us a picture of the changing distribution of foreign or domestic firms' jobs at the level of micro-regions.

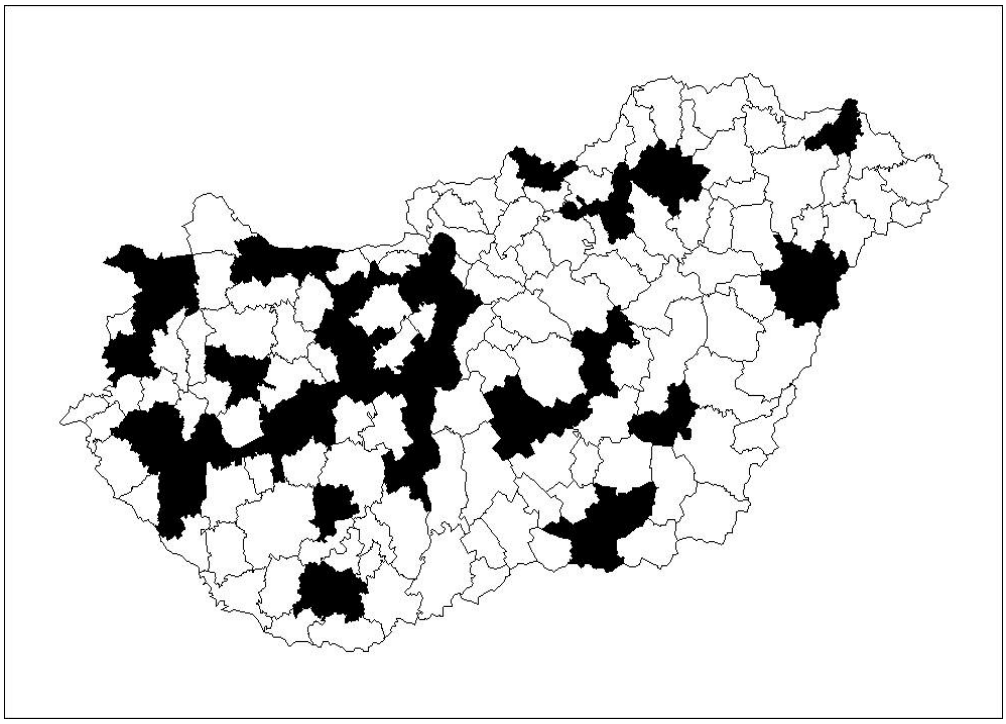
The correlation coefficient between the FIE's and DE's concentration indexes was 0.367 in 2000. It indicates that besides the degree of concentration there are differences between the spatial distribution of FIE's and DE's employment. Figure 7 shows top quartiles of micro regions according to their relative concentration indexes in 2000. One can see that the relative concentration of FIE's jobs is high in most of the micro-regions along the Austrian border but there are several regions of the top quarter even in the eastern part of the country. The relative concentration of DE's jobs does not show a clear east-west division.

Figure 8
Top and bottom quarters of micro regions according to their relative concentration indexes

FRCI



DRCI



Source: IE-FDI Data Base

Determinants of relative concentration of foreign and domestic firms

We can give a more detailed picture of the determinants of spatial concentration of FIEs and DE's jobs by estimating the *relative concentration* of jobs by regressions using some selected explanatory variables. In the case of Hungary, a series of empirical studies revealed that regional differences of employment capacity of micro-regions have been determined by three main factors: the industrial past of the regions, the proximity to the western portals and the education level of the local labour force. Some papers (Fazekas 2000, Hamar 1999) revealed that regions along the Austrian border attracted exceptionally high FDI inflows from Austria. Using variables as proxies of these factors we estimated repeated cross section regression estimation for the years 1993 – 2000. This approach produces estimates of the changing explanatory power of each variable over the eight years by the following way:

$$FRCI_{it} = \beta_1 + \beta_2 EDU_{it} + \beta_2 INUSTRY_{i,90} + \beta_3 DISTANCE_i + \beta_4 ABORDER_i + u$$
$$FRCI_{it} = \beta_1 + \beta_2 EDU_{it} + \beta_2 INUSTRY_{i,90} + \beta_3 DISTANCE_i + \beta_4 ABORDER_i + u$$

Where:

FRCI	= relative concentration index of FIE's jobs
DRCI	= relative concentration index of DE's jobs
EDU	= average number of completed classes in the local population, age 7+
INDUSTRY	= average ratio of employees in industry in 1990
DISTANCE	= average distance of the region's centre from the Austrian border on road (km)
ABORDER	= dummy variable. Austrian border regions = 1, other regions = 0
βjk	= regression coefficient
u	= error term
t	= years of observation (t= 1993–2000)
i	= micro regions (i =1-150)

The objective of the multiple regression estimation was to discover whether the explanatory variables are significant and to estimate the direction and the relative importance of each explanatory variable over the last eight years. We expect significant positive impact of EDU, INDUSTRY and ABORDER variables and significant negative impact of DISTANCE variable on the relative concentration of FIEs employment. We expect significant positive impact of EDU and INDUSTRY variables and do not expect significant impact of DISTANCE and ABORDER variables on the relative concentration of DEs employment. The results of the

estimations are summarised in Table 4. Adjusted R^{2-}s are between 0.36 and 0.51 in the case of foreign firms and between 0.42 and 0.55 in the case of domestic enterprises.

Table 4.
Results from the regression estimation

A. Foreign firms:

Dependant Variable= FRCI	1993	1994	1995	1996	1997	1998	1999	2000
Adjusted R Square	.363	.377	.428	.390	.465	.504	.510	.486
F	22.118	23.394	28.879	24.774	33.423	38.837	39.778	36.279
Sig.	0.000	.000	.000	.000	.000	.000	.000	.000
DISTANCE	**-.191** -2.385 .018	**-.198** -2.499 .014	**-.120** -4.320 .000	**-.094** -1.213 .227	**-.136** -1.876 .063	**-.149** -2.141 .034	**-.187** -2.707 .008	**-.186** -2.715 .007
WBORDER	**.139** 1.862 .065	**.060** .806 .422	**.182** 2.591 .011	**.167** 2.297 .023	**.201** 2.949 .004	**.201** 3.071 .003	**.200** 3.066 .003	**.188** 2.822 .005
INDUSTRY	**.305** 3.921 .000	**.179** 2.339 .021	**.182** 2.506 .013	**.337** 4.509 .000	**.346** 4.955 .000	**.362** 5.409 .000	**.375** 5.646 .000	**.379** 5.597 .000
EDU	**.214** 2.502 0.013	**.376** 4.485 .000	**.403** 5.078 .000	**.265** 3.261 .001	**.275** 3.632 .000	**.283** 3.921 .000	**.251** 3.517 .001	**.237** 3.269 .001

B. Domestic firms:

Dependant Variable= FRCI	1993	1994	1995	1996	1997	1998	1999	2000
Adjusted R Square	**.418**	**.457**	**.476**	**.483**	**.485**	**.474**	**.492**	**.547**
F	27.761	32.182	34.827	35.594	36.143	34.530	36.828	45.601
Sig.	.000	.000	.000	.000	.000	.000	.000	.000
DISTANCE	**-.043** -.558 .578	**.000** .006 .995	**.027** .373 .710	**.009** .119 .905	**-.020** -.278 .782	**-.040** -.553 .581	**.017** .237 .813	**-.006** -.086 .931
WBORDER	**-.023** -.326 .745	**.016** .233 .816	**-.026** -.392 .695	**.006** .087 .931	**-.086** -1.290 .199	**-.088** -1.302 .195	**-.037** .561 .576	**-.017** -.275 .783
INDUSTRY	**.3244** .393 .000	**.310** .000 .708	**.306** 4.389 .000	**.203** 2.941 .004	**.157** 2.293 .023	**.125** 1.810 .072	**.096** 1.423 .157	**.093** 1.452 .149
EDU	**.419** 5.148 .000	**.466** 5.912 .000	**.511** 6.667 .000	**.583** 7.754 .000	**.627** 8.450 .000	**.631** 8.478 .000	**.674** 9.260 .000	**.701** 10.254 .000

Note: Coefficient cells consist coefficients, t values and significance

Figure 9.
Time path of std. coeff. of linear regression estimations of relative concentration indexes (1993 – 2000)

FIEs **DEs**

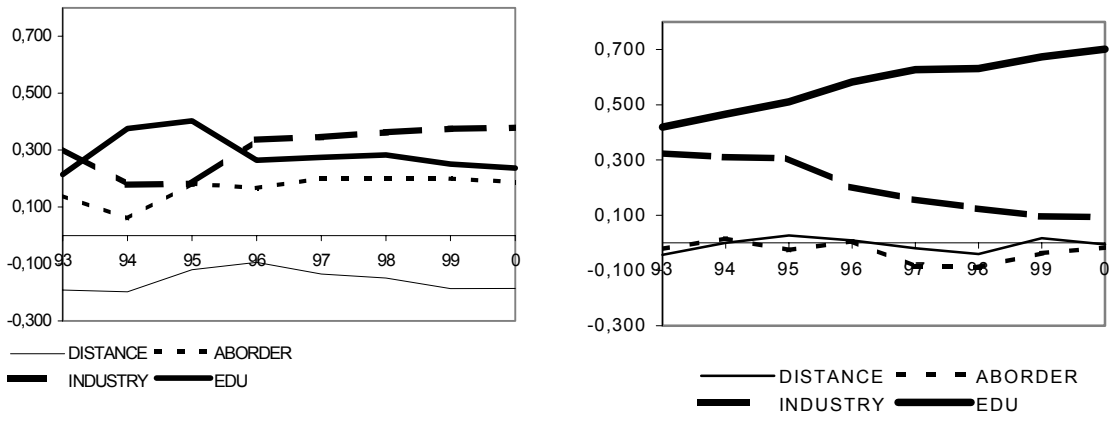


Figure 9 shows the time path of the standardised correlation coefficients in both groups. These results correspond to most empirical studies on regional distribution of FDI in CEE countries. One can see that:

- EDUCATION and INDUSTRY variables had significant explanatory power in both groups over the period. FIEs and DEs jobs concentrated in regions with an educated local population and relatively large industrial employment before the transition.

- In the case of domestic firms DISTANCE and WBORDER variables had no significant effects. The explanatory power of EDUCATION increased while the explanatory power of INDUSTRY90 decreased over the period. This tendency corresponds to the changing sector composition (increasing share of service sector and decreasing share of industry) in the group of domestic firms.

- In the case of foreign firms all four variables had significant effects on the relative concentration. FIEs' jobs concentrated in industrial regions close to the western border. WBORDER dummy and EDU variable had significant positive effect on the FIEs' jobs concentration. There were no major changes in the explanatory power of the variables during recent years.

According to our evaluation one of the most important messages of these results is that the education level of the local population is an important determinant of spatial distribution of both FIEs and DE's employment. Certainly the effect of the EDU variable captures the effects of a number of externalities offered by urbanised regions. Regions with a relatively highly educated population have a high share of the service sector, developed infrastructure, high geographical density of firms, high density of NGOs etc. These variables have no significant effect in addition to the EDU variable and when we exchanged the EDU variable with any of them the explanatory power of the estimation decreased.

Why do not FIEs or DEs flow towards less developed regions? - Regional differences in wages, productivity and unit labour costs of foreign and domestic firms

Despite continuous efforts taken by regional policy to attract investment to less developed regions, despite increasing scarcity of skilled labour in high employment regions[11] and despite marked wage differences between high and low unemployment regions[12] spatial concentration of FIEs and Des employment has not decreased over recent years, and corporate jobs have not moved towards low employment regions. On the contrary, low employment regions lost, while high employment regions gained corporate (mostly FIEs) jobs during recent years. It is not difficult to understand the reluctance of firms to move towards less developed, low employment regions if we compare the regional differences in wages, productivity and the unit labour costs of foreign and domestic firms.

Figure 10 shows regional differences in wages, productivity and unit labour costs in manufacturing in high and low employment regions. One can see that there are substantial regional differences in both groups. Wages are higher in high employment regions than in low employment regions but because of the high productivity gap between the high and low employment regions the unit labour costs of firms settled

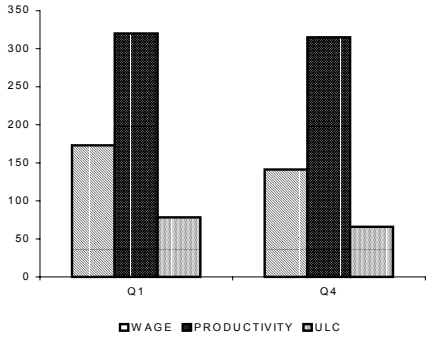
[11]Regional unemployment/vacancy statistics show increasing scarcity of (skilled) labour in the most developed regions and an increasing stock of job seekers in the depressed regions.

[12] Empirical studies on regional wage differences revealed that due to the increasing regional differences in unemployment and vacancy rates the regional wage curve was born in Hungary and the elasticities of wages towards unemployment rates were more or less the same than that of the market economies. (Köllő 2002)

in high employment regions is less than 80 percent of those settled in low employment regions.

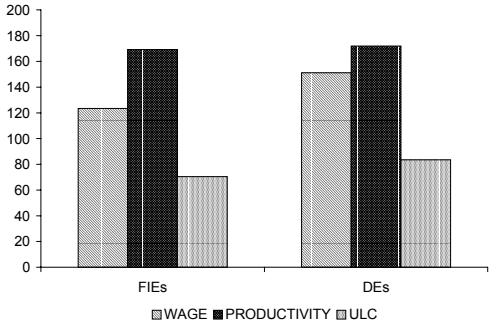
Figure 10
Regional differences in wages, productivity and unit labour costs in manufacturing in high and low employment regions

FIEs/DEs



Source: IE-FDC Data Base

HIGH/LOW

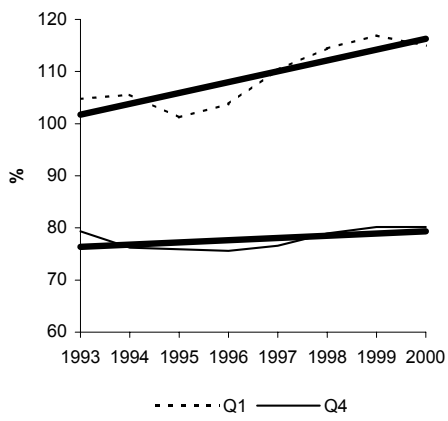


Source: IE-FDC Data Base

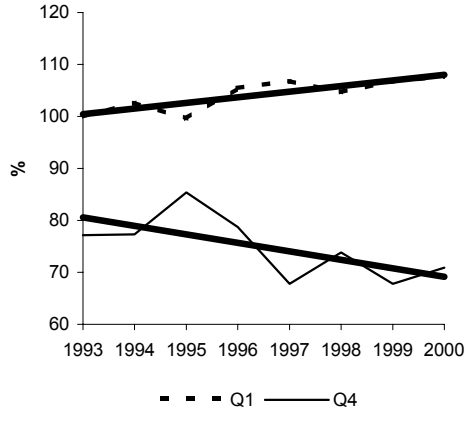
Besides region-specific factors (proximity, externalities offered by urban agglomerations etc) the regional productivity gap has been influenced by a number of firm specific factors, such as sector composition, technologies, labour/capital ratios of the firms located in the different regions. Unfortunately we have no relevant data to separate firms specific and region specific effects. Nevertheless the time paths of regional productivity gaps in the case of FIEs and DE's reveal a striking tendency. (Figure 11) The productivity gap between firms settled in high and low employment regions has substantially increased in both groups over the last ten years.

Figure 11
Time path of the productivity of firms settled in low and high unemployment regions (Q1 - Q4) Net sales/Employees as a % of the national average of FIEs and DEs

FIEs



DEs



A number of empirical studies indicates that regional productivity differences are reinforced by a kind of special regional effect, namely the regional spillover effects between foreign and domestic enterprises. According to empirical evidence in CEE countries and even in Hungary, the increasing density of FIEs has a significant positive effect on the productivity of domestic firms in the region. (Schoors and van der Tol 2002) This could be one of the explanations of the increasing regional productivity gap between firms settled in good and bad regions. The higher the density of foreign firms in the good regions, the stronger the spillover effect towards domestic (and foreign) firms and as a consequence of this effect the higher the productivity advantages of good regions are.

Conclusions and policy implications

In the first part of the paper we described the polarisation and the increasing core-periphery division of local labour markets in Hungary during transition. The driving force of this process was the fast integration into the world economy, and massive inflows of foreign direct investments into certain regions of the country. The bulk of net job creation was within the group of foreign firms in recent years and the vast majority of net job creation within the foreign firm sector were concentrated in high employment regions.

Foreign employment concentrated in industrial regions with a favourable geographical location, and a high level of urbanisation. Domestic firm's employment was also highly concentrated in urbanised regions. Both foreign and domestic firms show stable spatial concentration and pattern of distribution. A large and increasing productivity gap between winner and loser regions is one of the explanations of this stability. Both foreign and domestic firms located in high employment regions are much more productive than firms located in low employment regions. Besides firm- and region specific factors, regional spillover effects between foreign and domestic firms could explain this tendency. Supply side alleviating mechanisms (migration, commuting) are too weak to stop or to decrease further polarisation of local labour markets.

What can we expect in the future and what should be done to stop further deterioration of backward regions? The majority of studies on the impact of the EU

accession forecasts the increasing attractiveness of accession countries towards FDI inflows. Are there relevant policy options to avoid the situation where further increase of FDI inflows follow the same pattern, i.e. increase regional differences and polarisation in Hungary?

The second part of the paper demonstrated the education level of the local population has a crucial impact on the competitiveness of local economies. No doubt one of the most important tasks is to raise education levels even in the remote rural territories of the country. It is a long term and costly task of central and local governments and requires large scale development of the educational infrastructure.

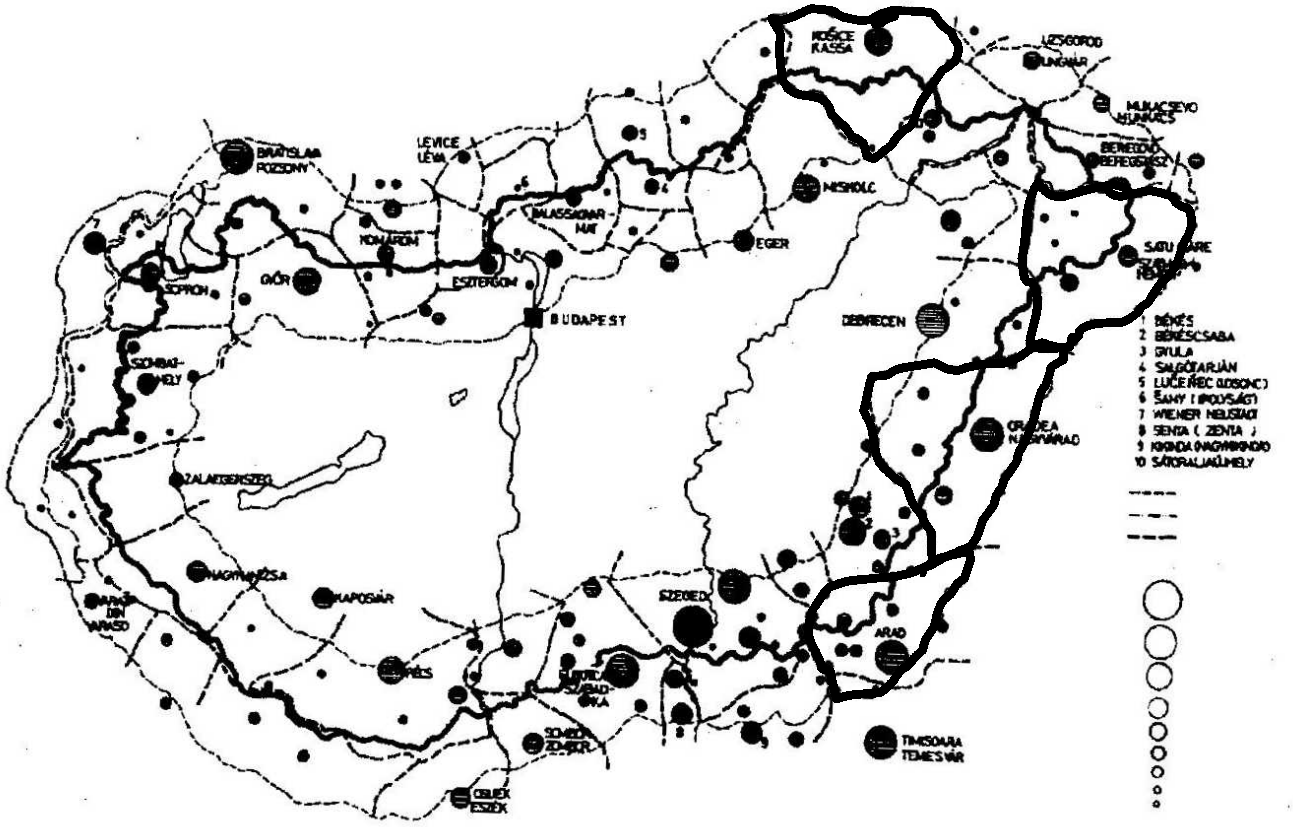
Analyses of the explanatory factors of spatial concentration of FIE's jobs show that in addition to the education/urbanisation level and industrial past, the geographical location (i.e. distance from the EU borders) has a crucial impact on the attractiveness of regions. Distance could be decreased by the development of transport infrastructure and some urbanised South-Transdanubian, and East-Hungarian regions could be connected to the most developed Central-Hungarian and West-Transdanubian agglomerations. The most challenging questions for the policy makers: What can be done in the case of remote rural regions along the north-east, east, south border? How will the EU accession affect their position in the years to come?

If we take into consideration the spatial consequences of globalisation and agglomeration, there is no real possibility to stop further deterioration of these regions. Nevertheless, let me finish this paper with a more optimistic picture. Figure 10 shows areas of influence of major cities in cross-border regions in Hungary. We can see that the present state borders deprive some remote rural regions from their historical urban centres.

Some of those cities like Kosice, Satu Mare, Oradea, Arad have a great potential to develop after the accession of their countries. Disappearing borders after the accession offers a possibility for some remote Hungarian peripheral regions to access to the developing local labour markets of urbanised regions located outside of the existing border. On the other hand in some developed border regions there are cities on the

Hungarian side of the border which could have positive effects on backward rural regions situated in neighbouring accession countries.

Figure 10
Areas of influence of maior cities in cross-border regions



Source: Kovács (1990)

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